

SEED PRODUCTION

Availability of quality seeds of improved cultivars is considered crucial for realizing productivity and adoption of cultivars in different agro-climatic conditions. The quality of seed alone is known to account for at least 10-15% increase in the productivity (ICAR 1993). However, lack of quality seed continues to be one of the greatest impediments to bridging the vast yield gap. Therefore, to approach the potentially realizable yield of a cultivar, production and distribution of quality seed is essential. The good quality seed should have the following characters:

- Genetic purity, and uniformity and should conform to the standards of the particular cultivar.
- Disease free, viable seeds.
- Free from admixtures of other crop seeds, weeds and inert matter.
- Acceptable uniformity with respect to size, shape and color.

Seed Production

Systemized crop production is known as seed production. In seed production adequate care is given from the purchase of seeds upto harvest adopting proper seed and crop management techniques.

The benefits of seed production are

- ❖ Higher income
- ❖ Higher quality seed for next sowing

Difference between seed and crop production

Seed production	Crop production
Basic seed should be from an authentic source	Any seed material can be used
Seed plot should be selected carefully for better performance, as per edaphic and environmental requirement	Can be grown in any area
Needs isolation from other varieties	Isolation is not necessary

Needs technical skill for maintenance of quality	Special technical skill is not required
Maintenance of genetic purity is important	Genetic purity is not required
Roguing is compulsorily practiced	Roguing is not practiced
Harvesting should be done at physiological/ harvestable maturity	Harvested at field maturity
Resultant seed should be vigorous and viable	Question of viability does not arise
Importance is given to seed quality rather than the yield	Importance is given more to yield

There are two types (major) of seed production ie. varietal and hybrid Seed production based on the type of seed used for multiplication .The difference between varietal and hybrid seed production are as follows

Varietal seed production	Hybrid seed production
It is single parent multiplication	It needs two to many parents
Isolation distance requirement is less	Isolation distance requirement is more
Production is by open pollination	Production is by managed control pollination (Female)
Seed can be used continuously for 3/4/5 generations	Seed has to be changed every time
Production technique is uniform (multiplication)	Technique differ with crop
Production care is less	Production care is more
Yield will be lower	Yield will be higher
Profit is less	Profit is higher

SCOPE AND IMPORTANCE OF SEED PRODUCTION

Indian Agriculture has made enormous progress in the last 50 years. Food grains production has risen from 50 million tons in 1947 to 212 million tons in 2003-04. The country has advanced from a situation of food scarcity and imports to that of food security and exportable surpluses. The Green Revolution of India has been universally acclaimed as a successful enterprise of the farmers, the Scientists and the Government. The land mark achievements in agriculture in the 60s and 70s were the result of a combination of inputs like introduction of high yielding varieties, increased fertilizer use, expansion of irrigation facilities, massive extension efforts, improved farm practices and, above all, ingenuity and industry of the Indian farmers. However, the growth of agriculture sector has not kept pace with the growth of the population and has stagnated. The unsatisfactory growth of agriculture, apart from serious implications for food security of the country, has been adversely impacting the growth rate of country's economy. The imperative of National food security, nutritional security and economic development demand a very focused and determined approach to raise productivity and production in agriculture. In view of the fact, that the area under cultivation is unlikely to increase significantly, thrust will have to be on raising productivity per unit of cultivated land.

Substantial increase in yield and quality of crops depends upon a number of factors viz., inputs like fertilizers, irrigation and plant protection measures and suitable agronomic practices. However, the use of high quality seed thus plays a pivotal role in the crop production. The use of poor quality seeds nullifies the utility of all agronomic practices and every other input applied to the crop no matter how lavishly they are applied. Economically, the cost of seed is a very small component of the total cost of production. Sindhur Sen (1974) summarizes the importance of seed quality thus "What are known as the seeds of hope may turn into seeds of frustration" if they are not of high quality. It is therefore, important to use the seed conforming to the prescribed standards in terms of high genetic purity, physical

purity, physiological quality and health quality. Since ages, Indian farmers were mostly dependent on traditional varieties, therefore seed requirements were met through farm saved seeds. The use of traditional varieties coupled with farm saved seeds whose quality is not guaranteed, resulted in drastic reduction in production.

Seed is the critical determinant of agricultural production on which depends the performance and efficacy of other inputs. Quality seeds appropriate to different agro-climatic conditions and in sufficient quantity at affordable prices are required to raise productivity. Availability and use of quality seeds is not a onetime affair. Sustained increase in agriculture production and productivity necessarily requires continuous development of new and improved varieties of crops and efficient system of production and supply of seeds to farmers.

The National Seeds Policy 2002 clearly emphasizes that "It has become evident that in order to achieve the food production targets of the future, a major effort will be required to enhance the seed replacement rates of various crops. This would require a major increase in the production of quality seeds....." According to the National seeds Policy 2002, the thrust areas have to be -

- i) Varietal Development.
- ii) Seed Production.
- iii) Seed Replacement Rate Enhancement.
- iv) Primary responsibility for production of breeder seed to be that of the ICAR/State Agriculture Universities.
- v) An effective seed production programme.
- vi) Popularization of new varieties.
- vii) Availability of newly developed varieties to farmers with minimum time gap.
- viii) Provision of incentives to domestic seed industry to enable it to produce seeds of high yielding varieties and hybrid seeds at a faster pace to meet the challenges of domestic requirements.

After the genesis of NSP, NSE & SSC and private seed companies, production of certified and foundation seeds have been undertaken by them.

Crop/Season-wise Requirement and Availability of Certified/Quality Seeds in India (2008-2009)(Indiastat.com)

Crop	Requirement	Availability
Cereals Total	13343953	16964189
Pulses Total	1749254	1829974
Oil Seed Total	4814665	5349716
Fibre Total	302279	361151
Patato	430000	430000

The Indian seed industry is the eighth largest in the world with an estimated value of INR 49 billion (USD 1.06 Billion) and with an annual growth rate of 12% to 13 %. The industry has shown a buoyant growth over the last two years on well supportive monsoons. The development of private seed industry is no more confined to just production and marketing of seed. It has well acquired technological strength to cater to the varietal needs of tomorrow. Along with industries Indian farmers have in recent years adopted intensive cultivation practices in order to meet the growing demand for agricultural produce.

India is bestowed with varied agro climatic conditions / zones, experienced and dedicated farmers, viable seed industry, legislations etc favouring the production of quality seeds. However, there is an urgent need for streamlining all our strengths to overpower the weaknesses.

Strengths

- A well developed and knitted seed multiplication and distribution systems linked with several ICAR institutes / SAUs / NSC / SFCI etc.
- A network of 20 seed certification agencies and more than 96 notified seed testing laboratories to legally assure the quality seeds moving in the seed market.

- A large number of varieties in different vegetable crops are available suited to varied agro climatic conditions. This makes the selection easier for taking up production in a particular area.
- Our county is bestowed with varied agro climatic conditions, which can be exploited for taking up seed production of vegetables at any time of the year in one or other part of the country.
- A very fast development of private seed companies which are helpful in bridging. The gap between demand and supply of vegetable seeds in the country.

Weaknesses

- Vegetable seed production in the country has been vulnerable to vagaries of weather resulting in production of poor quality seeds.
- Availability of realistic data on actual area under vegetable and requirements of vegetable seeds is inappropriate.
- Maintenance of isolation distance. Since in our system there is no restriction for planting any particular vegetable crops in any particular area, it becomes difficult many times to maintain the recommended isolation distance.
- Very low or no indents for new improved varieties due to ignorance about the performance of newly developed improved varieties.
- Non-availability of adequate nucleus and breeder seeds in the seed production chain.
- Problems in lifting produced seeds against indents.

Factors which affect demand

It is important to distinguish between actual demand, perceived demand and what the government expects the farmers to buy. The total amount of certified or labelled seed sold may be quite a small proportion of the total requirement.

Many factors have to be considered while assessing and forecasting demand. Some of these are:

- Cropping pattern and intensity
- Type of seed used

- Climate
- Demand for crop products
- Market scenario
- Disposable farm income
- Rate or level of adoption of new technology
- Government policy
- Crop cycles
- Habits and tradition
- Product performance
- Competitiveness
- Price
- Promotion

The most important factors that need to be taken into account when an individual company or organization is estimating the market share that may be gained by its own products are product performance, competitive positioning, price and promotion. This will form the basis of sales forecasting and production planning.

Demand Forecasting of seed

In adequate estimation of demand and the consequences of over production or under production can cause serious financial consequences for a seed company. Too many carryovers and stock write-offs will prove to be expensive, while lack of seed means a loss of revenue and a source of frustration for the sales force and the dealer network. This combination of special features in the seed industry makes the accurate assessment of demand even more critical. Some of these features are

- Longer period of time for the development new products from breeding programmes
- Seasonality of production
- Production subject to variables like agro climatic conditions outside the control of management
- Statutory controls and quality standards
- Existence of a generation system – where by the production in one year is the progenitor the next

- Limited shelf life and loss of germination
- Seed replacement rate: Seed Replacement Rate is the rate at which the farmers replace the seeds instead of using their own seeds

Seed Replacement Rate of Select Crops : 2005-06

Crop	SRR (%)
Paddy	17
Millets	7
Pulses	12.5
Cotton	10/15
Rainfed /Irrigated	
Groundnut	5
Gingelly	15
Sunflower	50
Castor	30
Soyabean	20

Source: Narrative notes on Plan Programme-2005-06, S.P.C, ,Chennai.

In demand forecasting the first step is to calculate the existing requirement multiplied by percent bought seed, which is the amount of commercial seed purchased by farmers. In calculating seed requirement, seed multiplication rates must be taken into account. Seed Multiplication Ratio is the ratio at which the seed multiplies.

In the present Indian scenario, seed production can be taken up as a small-scale industry or it can be taken up as under contract for the other seed companies. In either way, seed production has huge potential to ensure better returns.

SCOPE FOR SEEDS EXPORT

There is lot of scope for marketing of seed by Indian seed companies in countries lying between 30^o North and South latitudes, which are having similar agro-climatic situations and the varieties bred in India are suitable as well as comparable to varieties produced in European Union (EU), USA and Japan etc. In addition, wage rates and consumption pattern of those areas are comparable to Indian conditions. The seed can be exported from India to Indonesia, Bangladesh, China, Sri Lanka, African countries. Central and South America and markets in developed countries. The Indian cotton hybrids are suitable for African countries, where the wage rates are low for hand picking in indeterminate types. The hybrid seeds of paddy, cotton, maize, sorghum, pearl millet, sunflower, varietal seeds of paddy, vegetables (tomato, brinjal, gourds and bhendi) can be produced more economically in AP for export purposes.

Export opportunities

The export opportunities can be classified into two major categories.

- i. Custom production of vegetable seeds (including hybrid vegetables)
- ii. Export of branded seeds

i. Custom production of vegetable seeds (including hybrid vegetables)

Hybrid vegetable seed production is highly labour intensive. As the competition is going up, most of the major global companies are outsourcing the seed production to the countries having labour cost advantage *viz.*, China, Thailand, Vietnam, Chile, India etc. several Indian companies have established good reputation over the past 10 years by supplying good quality seed under contract production. We also have experienced and skilled manpower to take up this activity on large scale. If we look at the production capacity 70% of India's seeds' sales come from farmer bred seeds, 26% from those bred in publicly financed institutions, and only 4% from researched hybrids. The domestic hybrid seeds

market is placed at INR 4.9 Billion and is annually growing at 10% a year, against the 5% global growth rate.

ii. Export of branded seeds

Over the last 15-20 years, Indian seed industry has emerged as a vibrant research based industry (in vegetable as well as field crops). Several innovative superior products have been developed for widely varying agro-climatic conditions in the Indian agriculture. It is reported that Indian germplasm / seeds can adopt very well in the countries falling in the region 30° North and South on the equator. This would cover markets of several developing countries from Central / South America, Africa and Asia. Incidentally, both Africa and Asia are presently the fastest growing markets. Indian seed sector with its vast germplasm base and trained man power would become a strong technology source for such countries.

Agri –export zones

India has her own inherent strength in agriculture and agriculture exports. Now these have been strengthened with the liberalization, privatization policies of the government and the positive clauses in the World Trade Agreement with which India can poise to double its agro exports to Rs.200 billion by 2007.

With a view to promoting agricultural exports from the country and remunerative returns to the farming community in a sustained manner, the concept of Agri Export Zones (AEZ) was floated. These zones have been set up for end-to-end development for export of specific products from a geographically contiguous area.

